

**THE INFLUENCE OF TWO-STAGE MIXING TECHNIQUE ON THE  
STRENGTH AND WORKABILITY OF CONCRETE  
CONTAINING PFA AND MICROSILICA**

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**ABSTRACT**

This paper presents the results of an investigation into the influence of differing levels of PFA replacement on the mechanical properties of concrete mixes in terms of strength and workability. These mixes have been established by Elkem Materials, Ltd with Tarmac Topmix, UK as basic high quality concrete mixes for road pavement. The mix design contains cementitious material, 10% dosage microsilica and different levels of replacement material. The replacement material investigated in this study is pulverised fuel ash (PFA). Conventional and two-stage mixing techniques are used to prepare the tested samples. The microstructures of the material produced is investigated using Scanning Electron Microscopy (SEM, in order to obtain an understanding of the effects of microsilica, PFA and the two-stage mixing technique on the physical properties of the concrete. The concrete mixes with different proportions of cement replaced by PFA are shown to have a high quality in terms of strength, workability and durability. The concrete produced would be an economically attractive material to use as its cost would be greatly reduced.

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